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# STEAME: Guidelines for Developing and Implementing STEAME Schools

**Prof. Gregoris Makrides, Ph.D.**

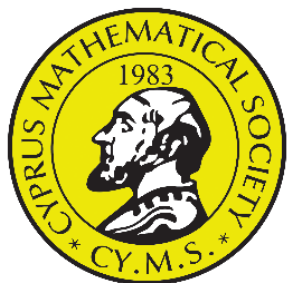
**President, Cyprus Mathematical Society, Cyprus**

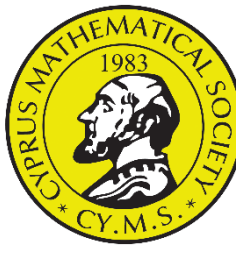
**Professor of STEAME Education, Pedagogical University of Krakow, Poland**

**President, THALES Foundation**

Project Number: 2019-1-CY01-KA201-058240

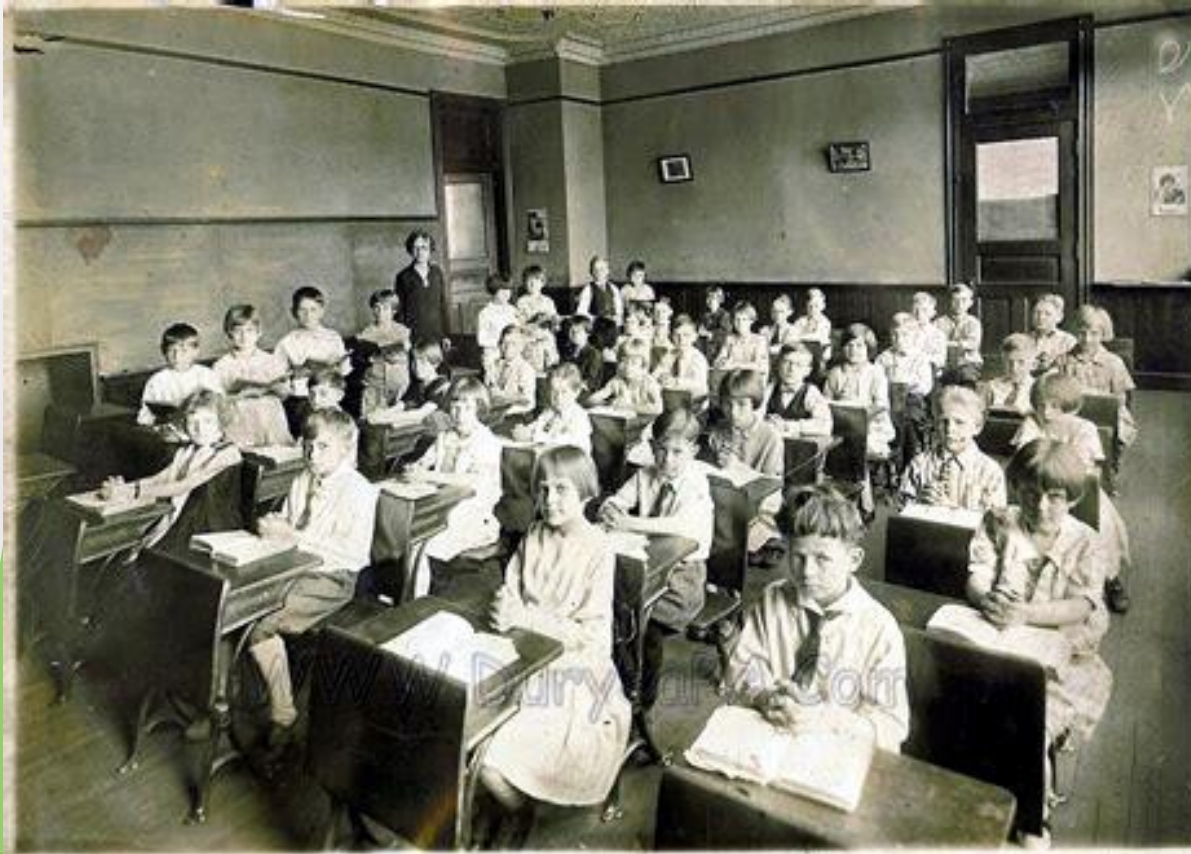
This project has been funded with support from the European Commission.  
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## Einstein said

*"Imagination is more important than knowledge. Knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand."*

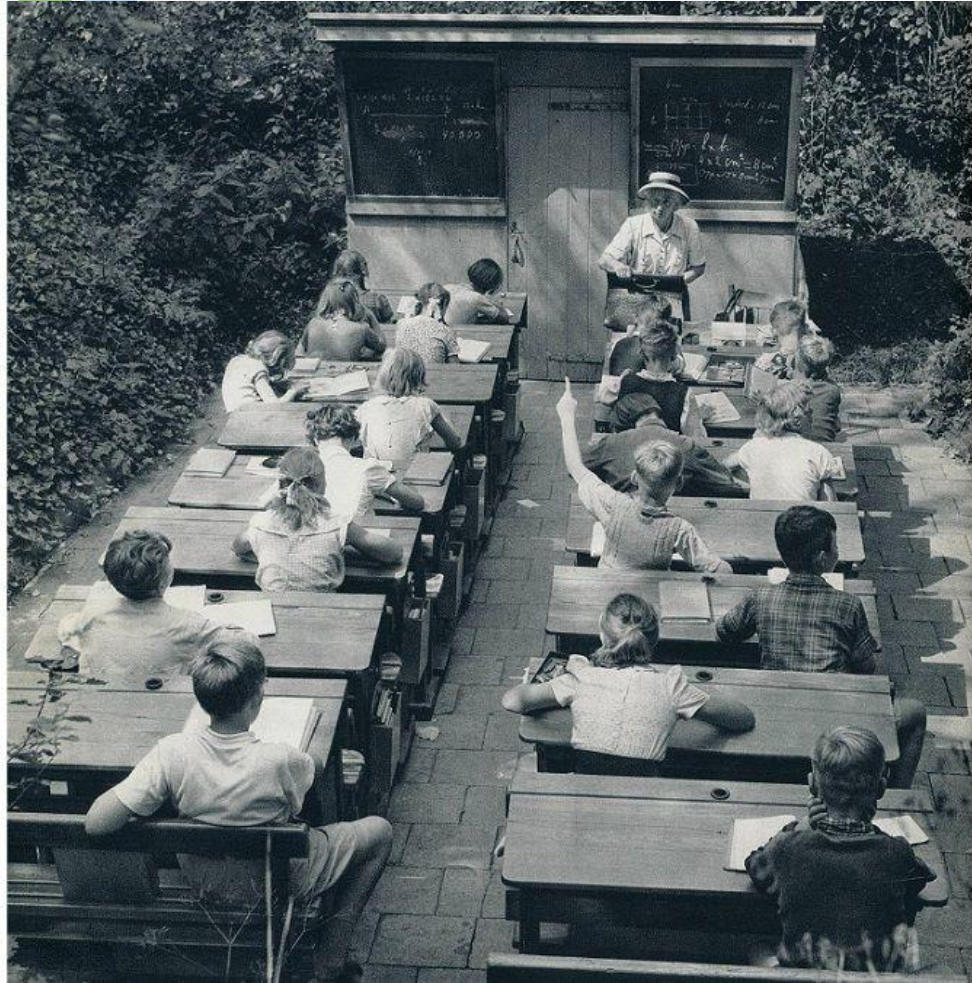


1921



2021



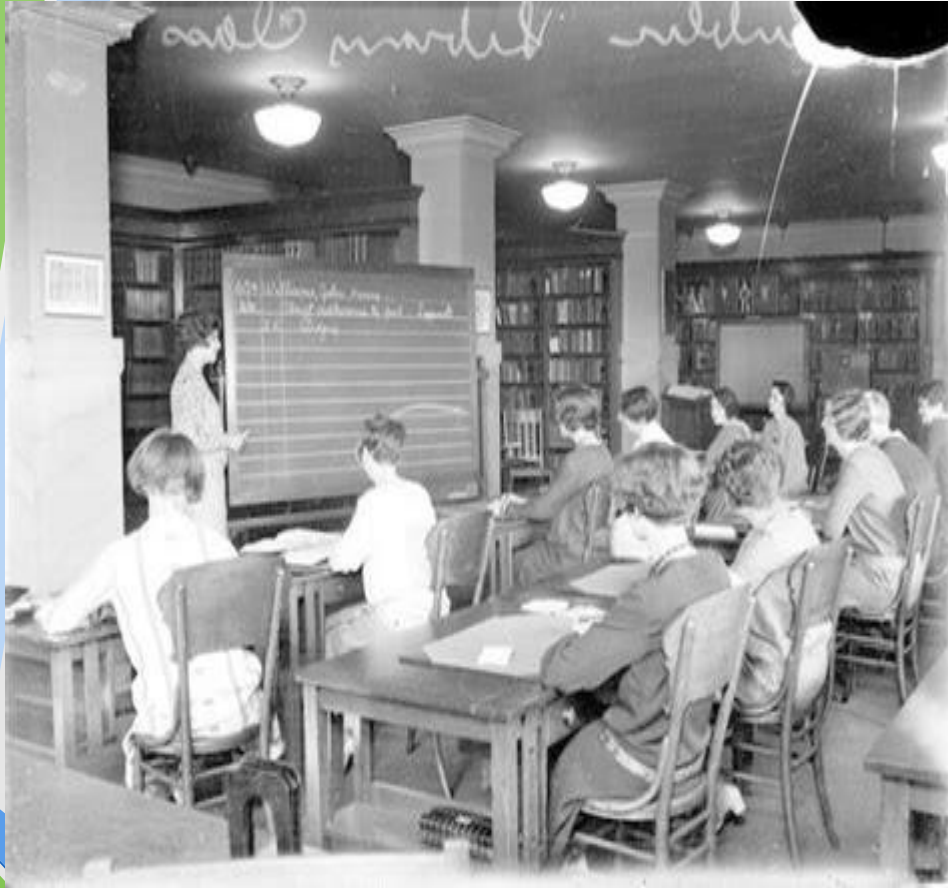


1950 With air-condition



2021 with air-condition





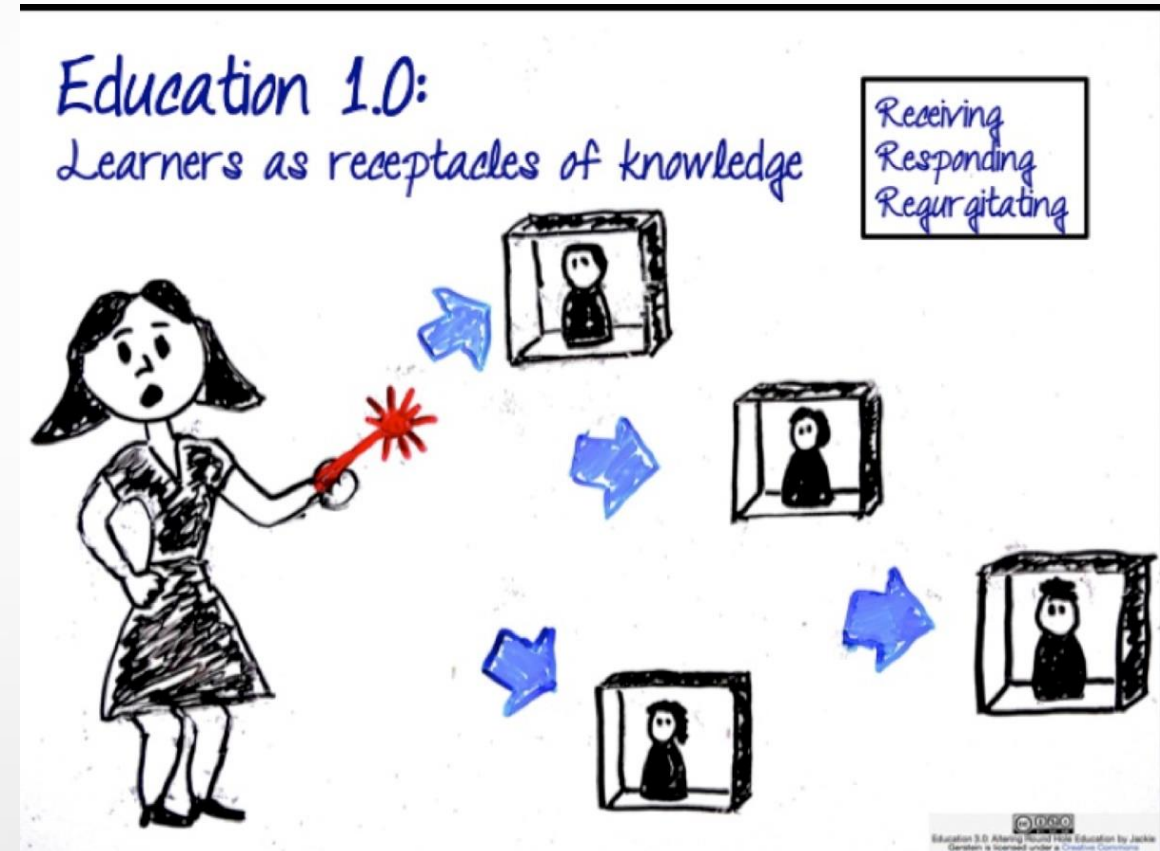
**1960 portability**



**2020+ portability**

## EDUCATION 1.0

- Authoritarian
- The student is the passive recipient
- Teacher-centered system - the teacher gives knowledge as the absolute leader in the classroom
- Technology is forbidden in the classroom



## EDUCATION 2.0

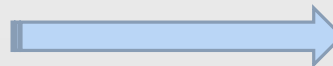
- Communication and collaboration are starting to grow
- Exam-based approach - the result is the examination - Memorization of knowledge
- An underestimated student-centered approach, we call it but do not apply it.
- the schools are still talking about hours of teaching ..... But they should talk about hours of learning !!!

### Education 2.0:

*Learners as communicating, connecting, collaborating*



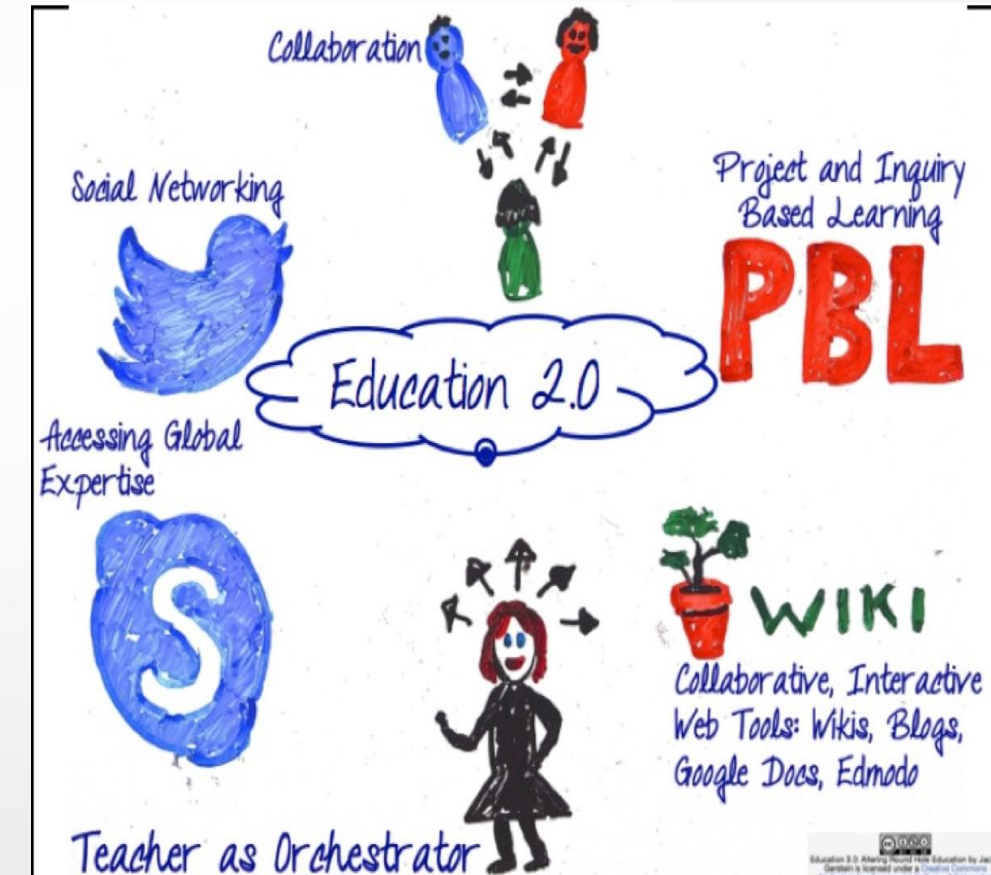
Education 3.0: Altering Round-Hole Education by Jackie Gerstein is licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported





# EDUCATION 2.0

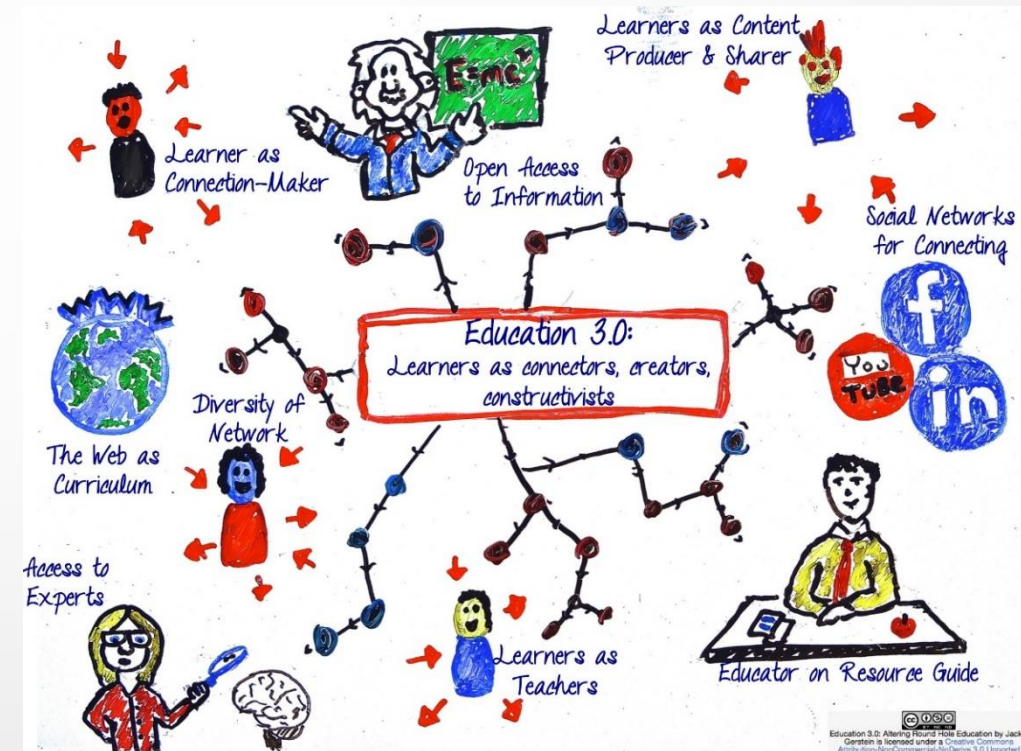
- Invasion of technology and social networking
- We apply technology to the classroom as a trend indicator, but ..... the class continues to have the same structure.
- Complete confusion ... .. students know the technologies better than teachers
- No design for what is used and what is not
- Many choices, there is no money for buying and applying, uncoordinated technology correlation with the curriculum ... .. the system can not properly follow the evolution of technology ... there is no teacher training ..... data is everywhere ... .. Google Search faster from traditional libraries ... the web knows more than our teacher .... **WE WERE NOT READY FOR COVID-19**
- Students give technical knowledge to their teachers ....



# EDUCATION 3.0

- Student-Centered approach
- The teacher is transformed into a Coordinator/facilitator, advisor, learner and practice guide
- The student is researching
- Flip classroom method applies
- More dialogue, technology is everywhere, the student is self-learning and everywhere.
- The classical style classroom no longer exists
- Lesson Plans are now called...

... *Learning Plans*





2021







**2025+**



2030+

## **EDUCATION 4.0**

- **Co-creation and innovation in the centre**
- **Whenever and Wherever**
  - Flipped classroom applied (Hybrid Learning Environments)**
  - Interactive practical exercise – F2F or Distance**
- **Learning is done at home or outside school, while in school students develop skills**
- **Development of personalized teaching and learning**
- **Learning Plans are now called Learning & Creativity Plans**
- **The technology**
  - Its free or/and easily accessible,**
  - Increased use of virtual reality, artificial intelligence ,etc**
  - Continuous evolution and innovation and therefore a need for development of Competences and Skills so people become Adaptable to Change**



2.0  
Lesson Plans

3.0  
Learning Plans

4.0  
Learning  
&  
Creativity Plans

November 2019 – December 2021

**STEAME : Science-Technology-Engineering-Arts-Mathematics-Entrepreneurship**

**[www.steame.eu](http://www.steame.eu)**

**STEAME: Guidelines for Developing and Implementing STEAME Schools**

**What was needed?**

*Model of STEAME Schools*

*Guidelines for STEAME Activities in Schools*

*Guidelines for cooperation between teachers of different disciplines*

*New organizational structures for STEAME schools*

*Training of Teachers - help them to adapt*

*Dynamic Change in Curricula, Tools, Methods*



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of the European Union

# Outputs

- O1. Guidelines for dynamic and adaptive STEAME curricula – **Completed-published**
- O2. Guidelines for STEAME Activities in Schools for two age groups – **Completed – published**
- O3. Guidelines for STEAME School Organizational Structure – **presenting today**



Science



Technology



Engineering



Arts



Mathematics



Entrepreneurship



## O3. Guidelines for STEAME School Organizational Structure

- **TYPE A:** How can we run STEAME activities in current school infrastructures ?
- **TYPE B:** What should a school look like in order to best run STEAME activities?
- **KA1** four days STEAME training course for teachers, is published for
  - 10-13 February 2022 in Paphos, Cyprus
  - 27 June – 1 July 2022 in Thessaloniki , Greece
  - 25-29 July 2022 in Agros, Cyprus
  - Blended STEAME & INNOMATH on 1-3 February, Krakow, Poland

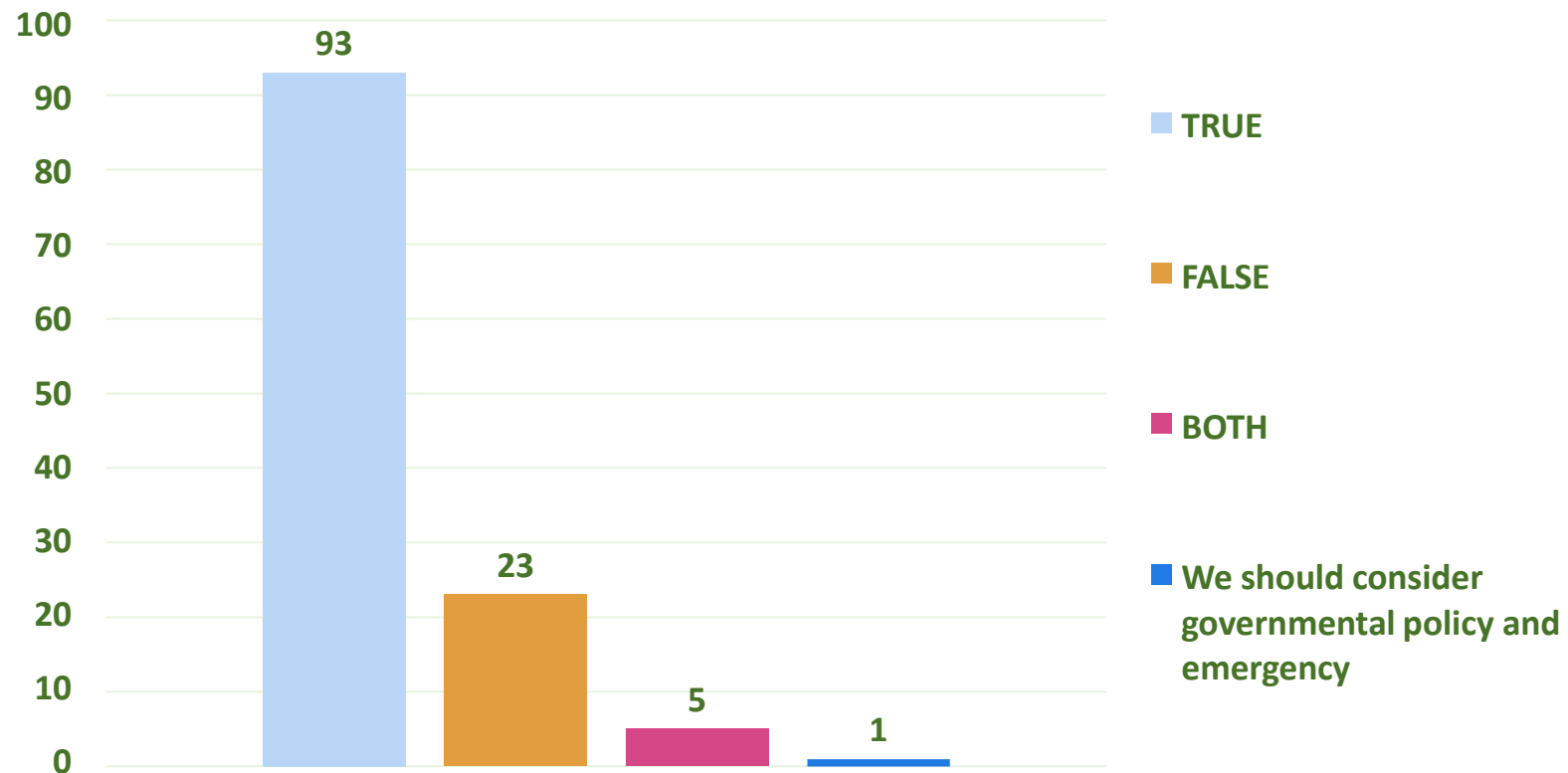


## **Some results from the ONLINE European survey conducted in 2020**

**122 responses mainly teachers and school principals**



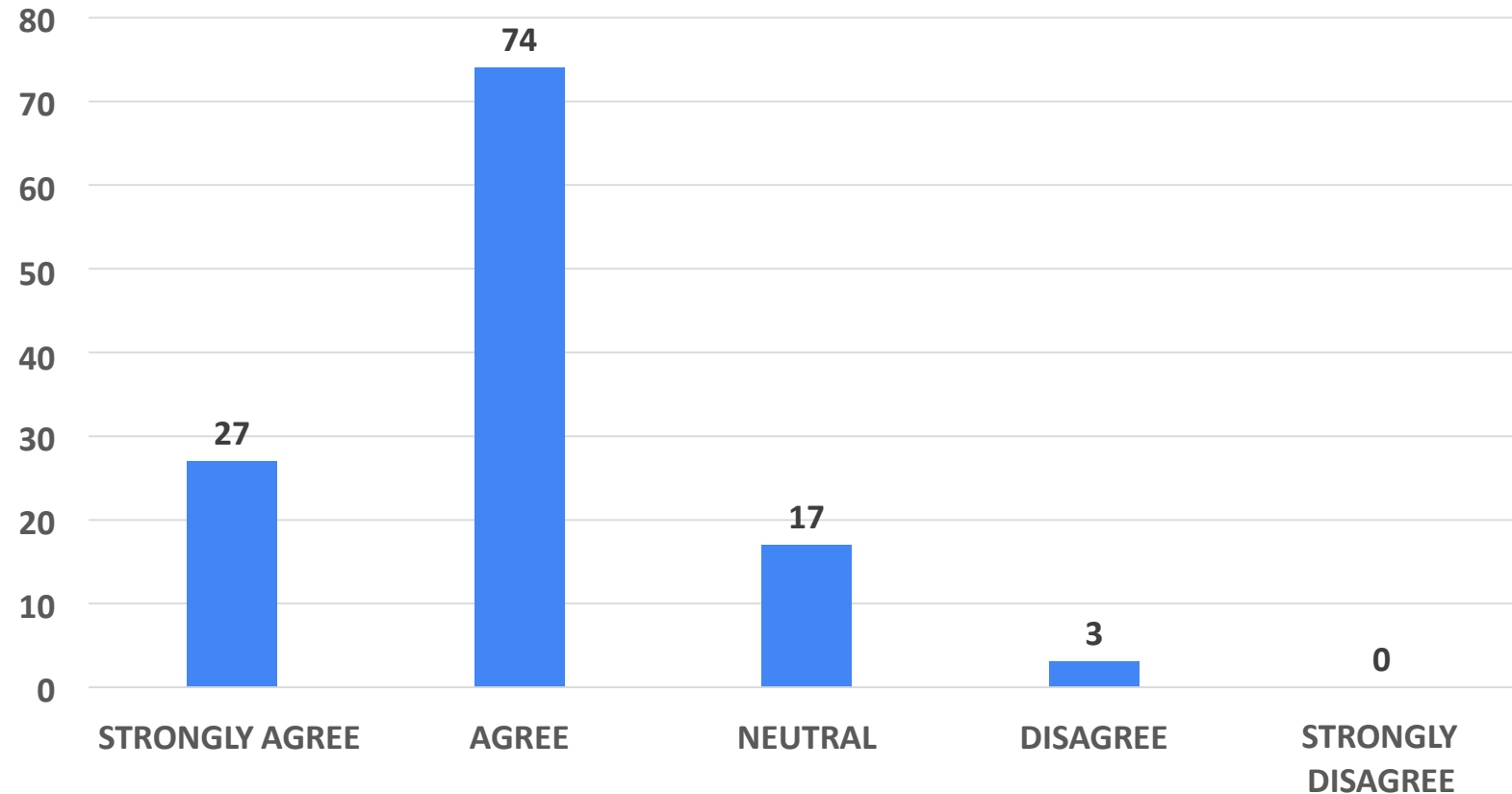
The STEAME program should shape the education process of the school and the classroom design, not the other way around.



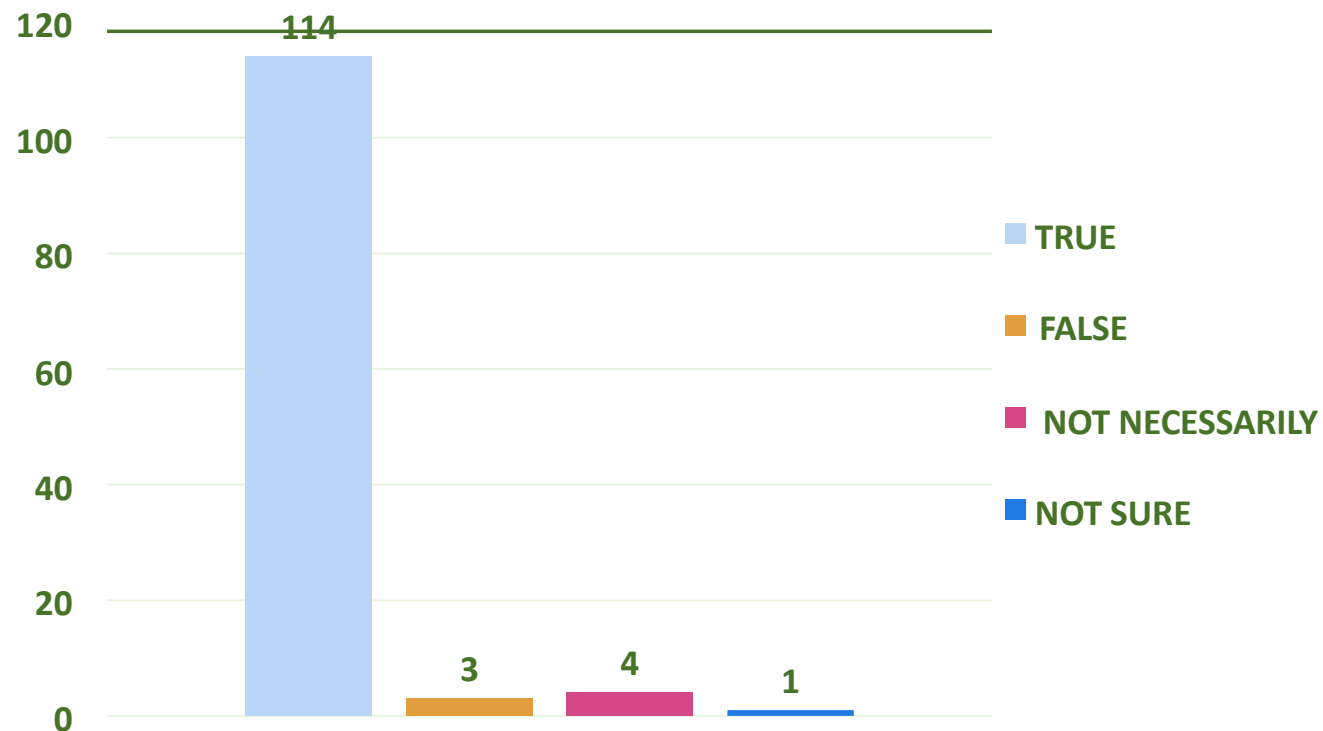




The classroom layout should be aligned with the outcomes of STEAME and blended learning

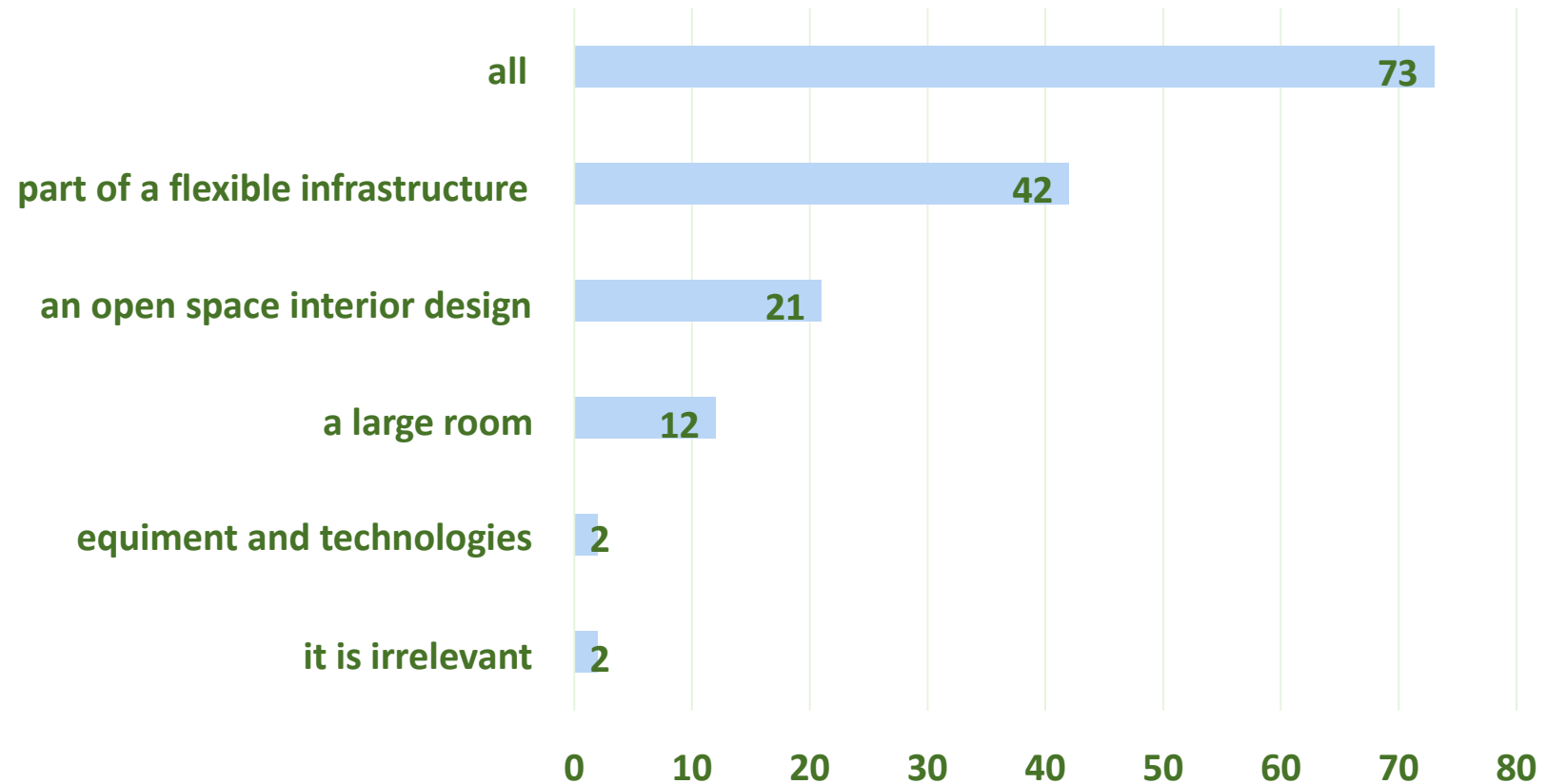


The classroom furniture has to be moveable in order to enhance layout flexibility



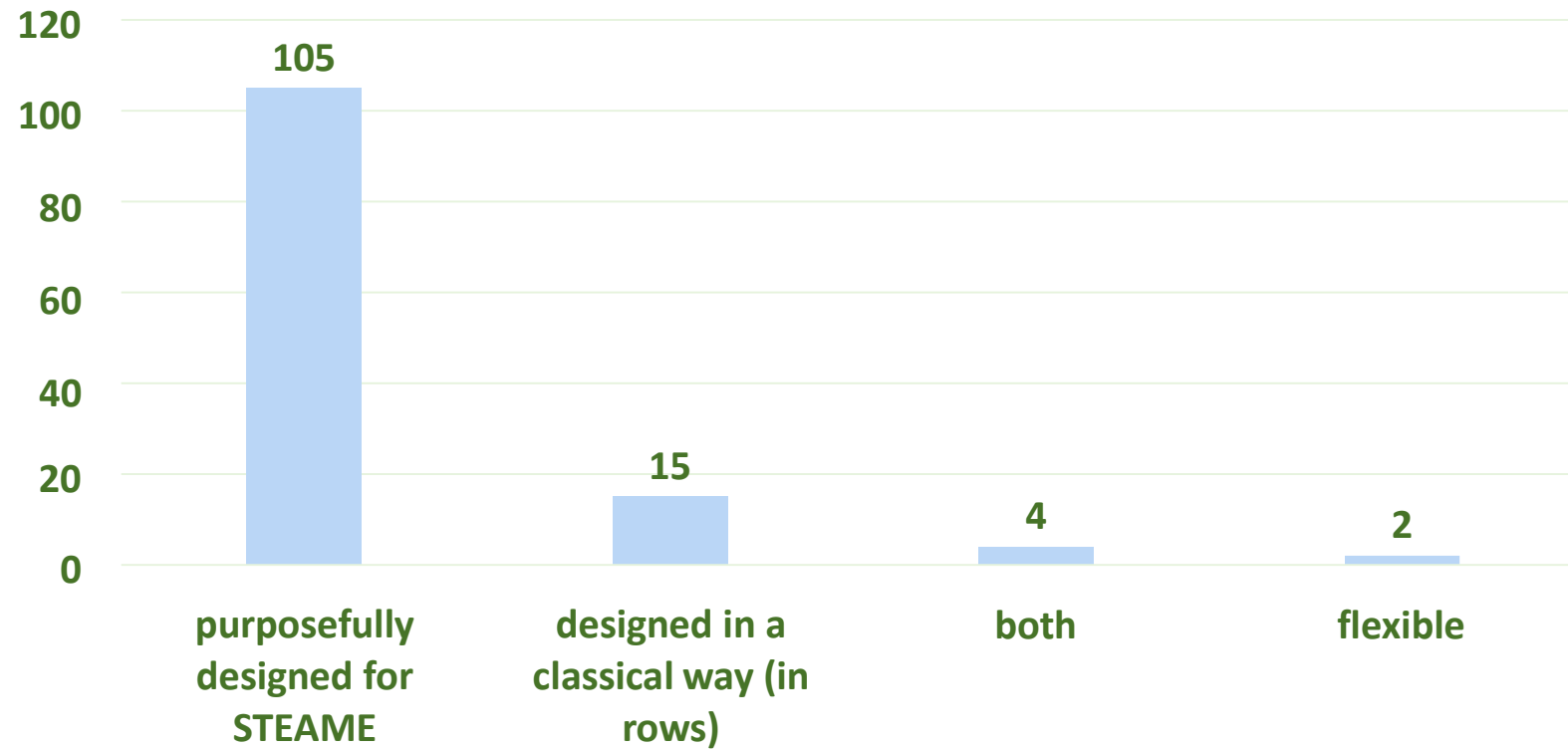


To achieve blended learning the STEAME classroom should be





## The classroom should be





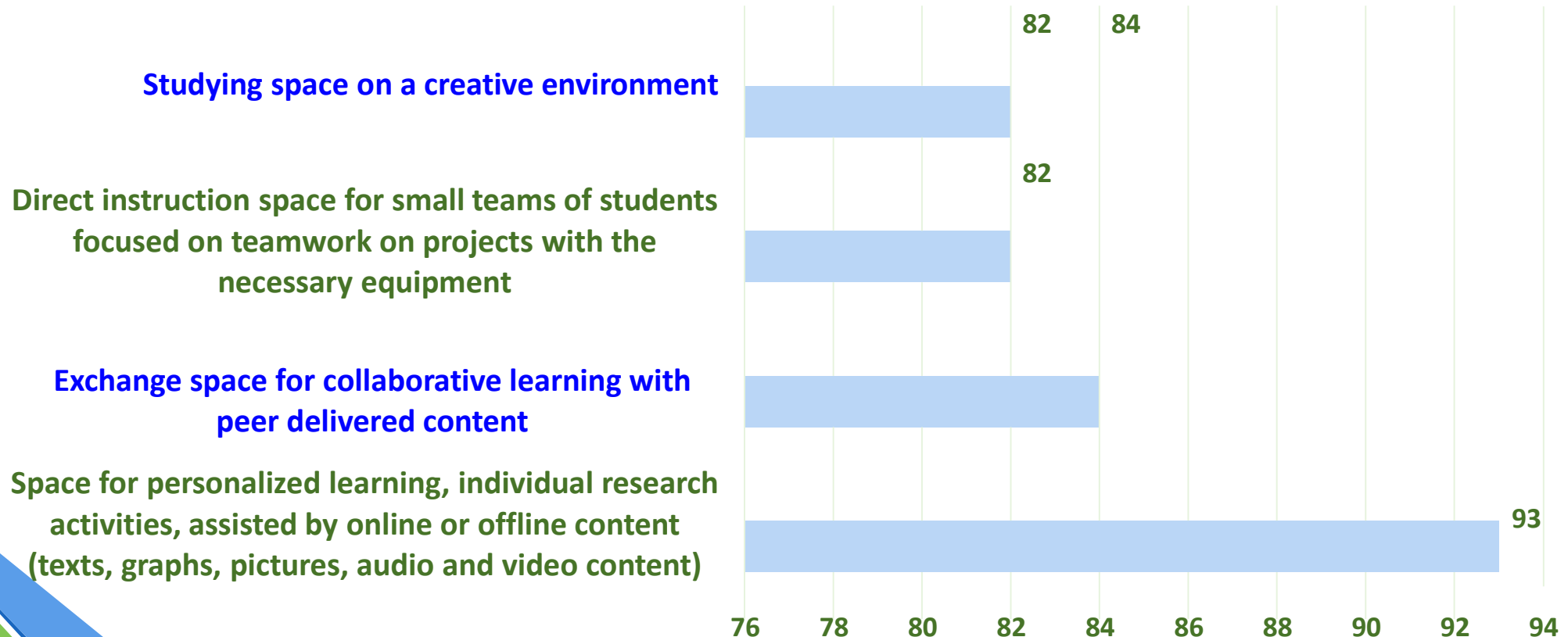
## Ideas related to the school and the classroom design

- Assessment should be creation-based, without the typical exams but outcome assessment and creativity assessment.
- Assessment should become a co-assessment between teachers and they need to learn to work together in different fields with groups of students.

*Thus, teachers need training for the change of mode of facilitating the learning and assessment.*



## STEAME schools must integrate the following spaces

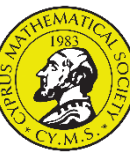






## Ideas related to the integration of spaces

- Without paper books, all books should be digital.
- Students come to school without school bags, only tablets where they keep everything.
- Schools should have internet but NO WIFI.
- Schools should be all days schools from 8 to 5 without homework. After 5 pm it should be play time.

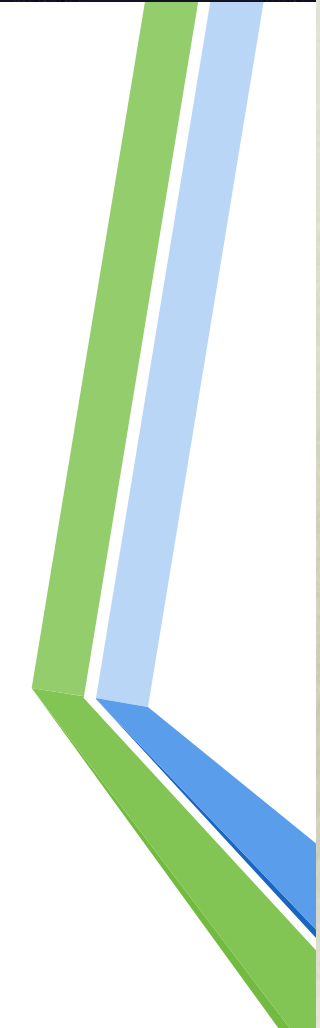


# STEAME School of the future

- **Architectural Designs**



VectorStock



# STEAME SCHOOL





# STEAME SCHOOL





# STEAME SCHOOL





STEAME SCHOOL



# Specs Basement

## BASEMENT

- STEAME THEATRE

### MAIN LABS

- B1.1 Main Biology Lab
- B1.2 Main Chemistry Lab
- B2.1 Main Physics Lab
- B2.2 Main Mathematics Lab
- B3.1 Main Construction and 3D printers Lab
- B3.2 Main Environmental Lab
- B4.1 Main Robotics Lab
- B4.2 Main Computing and Software Lab
- B5.1 Main Prototype Development Lab
- B5.2 Main VR Centre Lab
- B6.1 Main Skills and Talent Development Lab
- B6.2 Main STEAME Communication Lab

- Additional VR rooms
- Learning stations
- Entry into amphitheatres





# Specs Ground Floor



## Satelite Labs

- G3.1 Biology-Chemistry S-Lab
- G4.1 Physics-Mathematics S-Lab
- G5.1 Industry Liaison Office
- G5.2 Virtual Business Centre
- G1.1 Robotics – Computing –Multimedia S-Lab
- G1.2 Sound-proof student meeting room
- G2.2 Construction- Environmental S-Lab
- G2.1 Sound-proof student meeting room
- G3.2 Sound-proof student meeting room
- G4.2 Sound-proof student meeting room
- Individual Learning Stations as private u-shape booths
- Open space movable furniture for small group work by students
- Courtyard
- Reception area
- Entry into amphitheatres

# Specs

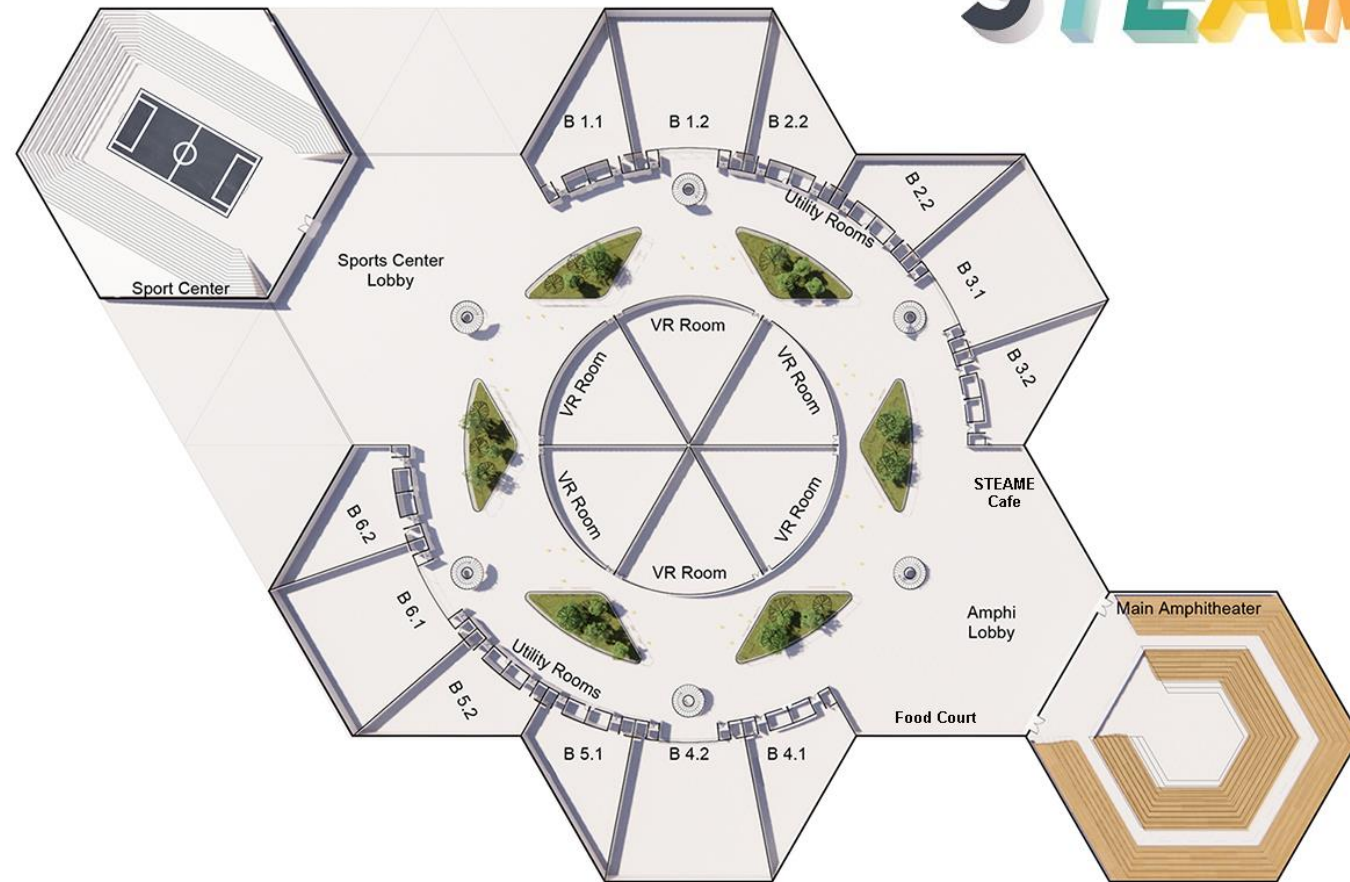
## First floor

### THE VERY QUIET FLOOR – THE IDEAS FLOOR

- Open space flexible movable furniture for student groups
- Co-creation Train moving ...with group siting stations
- Learning Centres/Rooms
- Additional Learning Stations
- Entry into amphitheatres
- Slow Moving STEAME train
- Administration offices

# Specs Roof

- Recreation spaces
- Cafeteria
- Garden and Lake
- Photovoltaics
- Football court
- Athletic field
- Open Amphitheatre

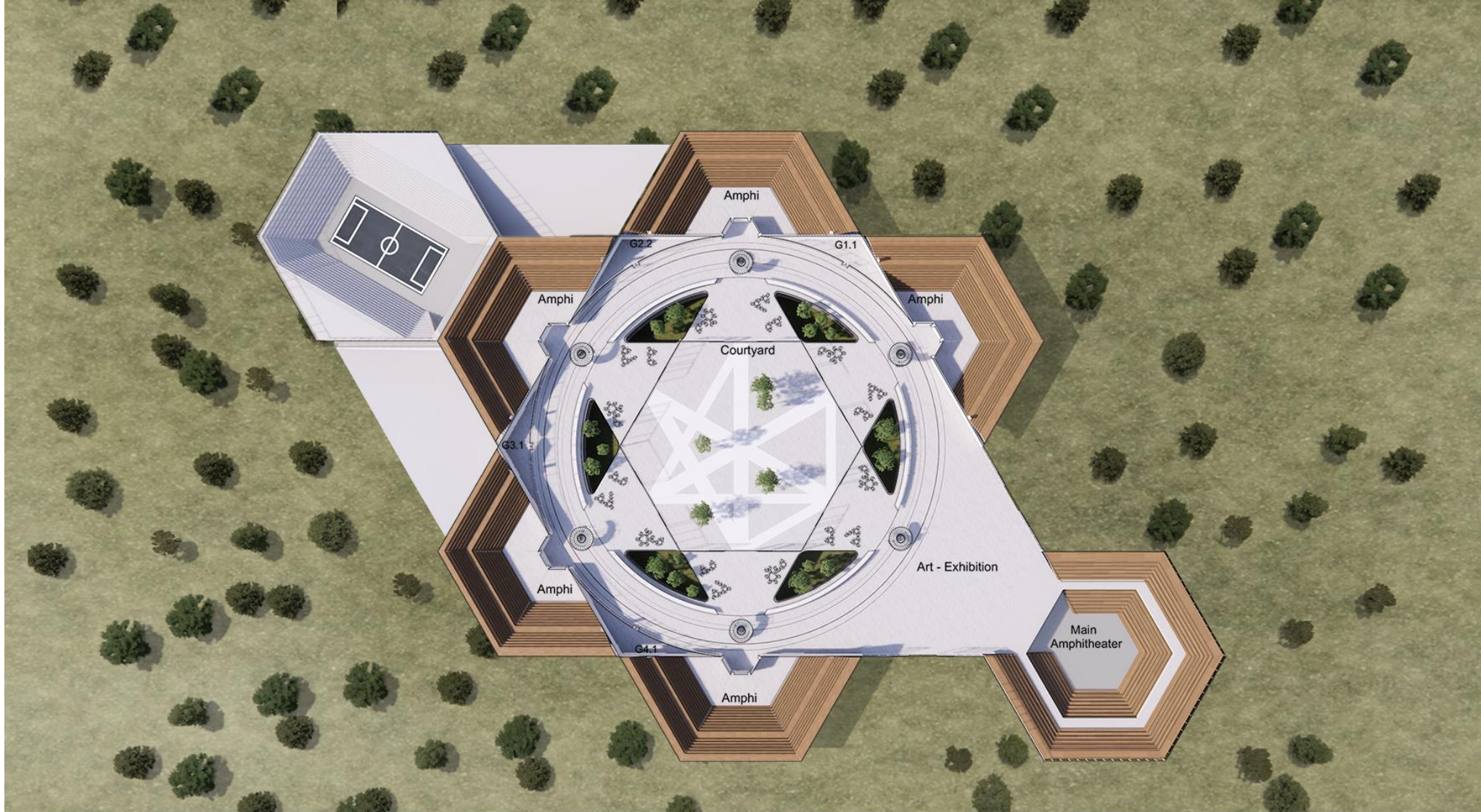


#### MAIN LABS

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BASEMENT  
1:2000 @ A4





**Satelite Labs**

G1.1 Robotics – Computing –Multimedia S-Lab

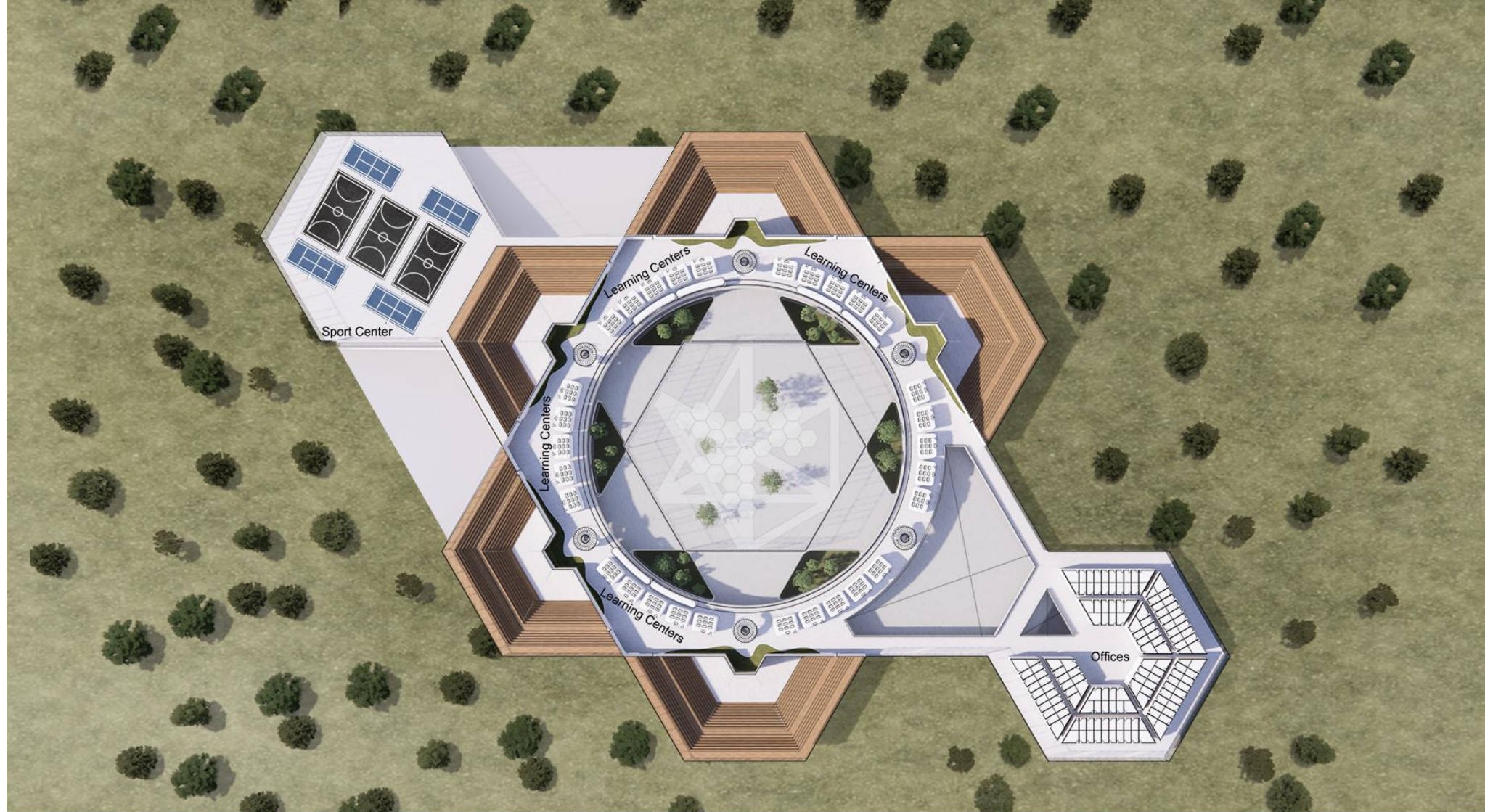
G2.2 Construction- Environmental S-Lab

G3.1 Biology-Chemistry S-Lab

G4.1 Physics-Mathematics S-Lab

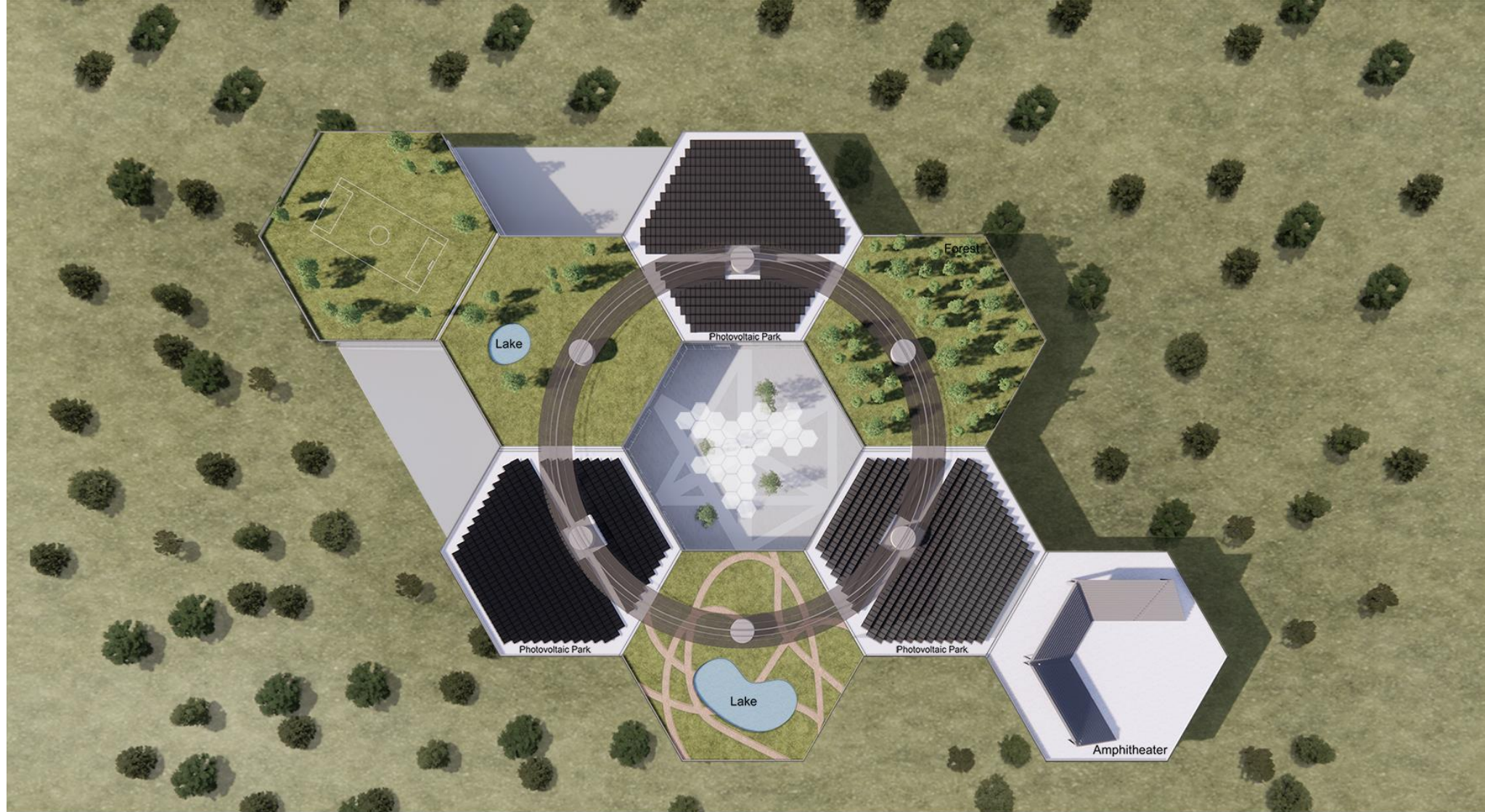
**GROUND FLOOR**  
1:2000 @ A4





1st FLOOR  
1:2000 @ A4





ROOF  
1:2000 @ A4



# STEAME BASEMENT



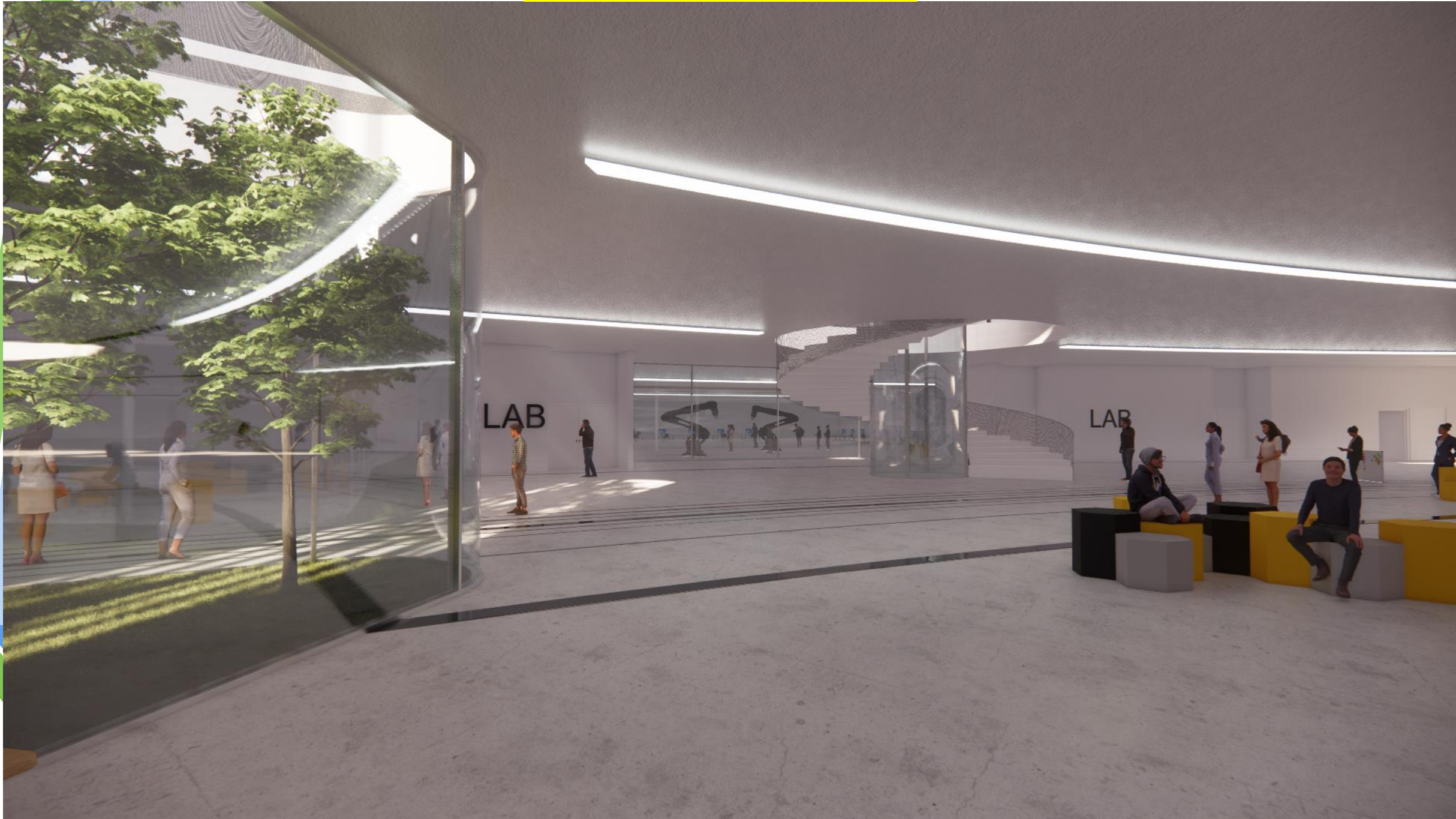


# MULTI-SPORTS FIELDS OF THE FUTURE

[VIDEO](#)

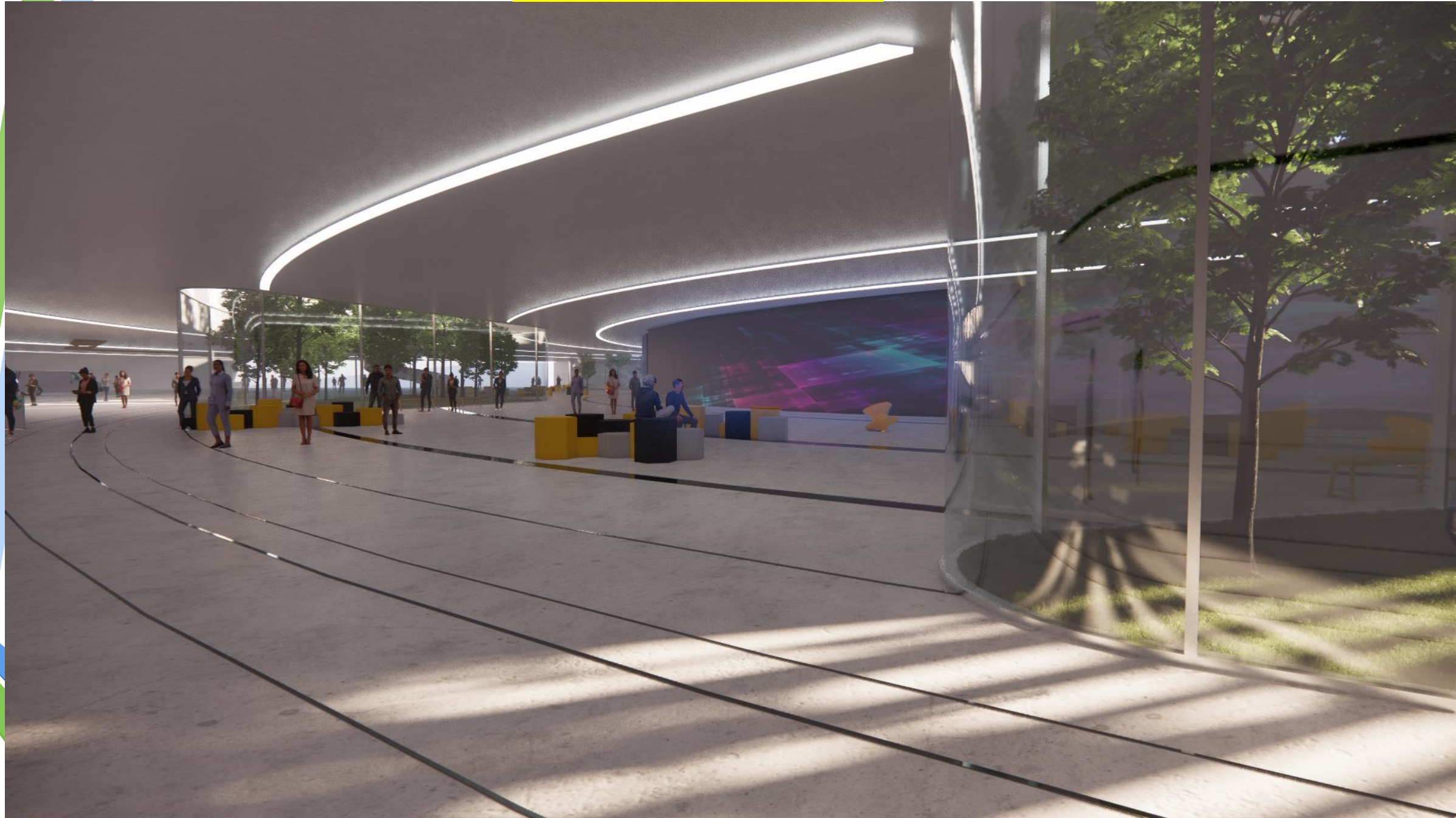
Video is published on STEAME Observatory  
[www.steame.eu](http://www.steame.eu)

## STEAME BASEMENT LABS





## STEAME BASEMENT VR





# GROUND FLOOR





## GROUND FLOOR LEARNING STATIONS





## FIRST FLOOR LEARNING ROOMS



## FIRST FLOOR





# FIRST FLOOR





FIRST FLOOR STEAM TRAIN



FIRST FLOOR STEAM TRAIN





## FIRST FLOOR STEAM TRAIN





## FITST FLOOR LEARNING ROOMS



## FITST FLOOR LEARNING ROOMS





## FITST FLOOR LEARNING STATIONS

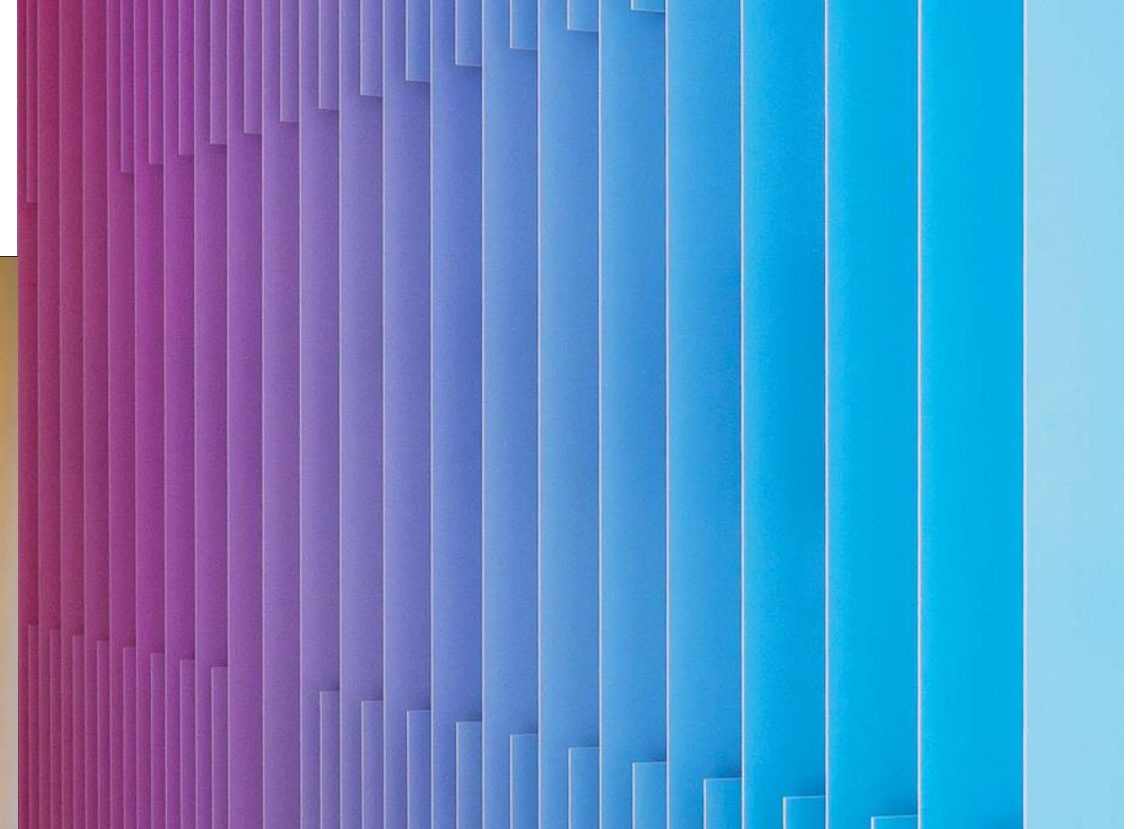




## FITST FLOOR VIEW



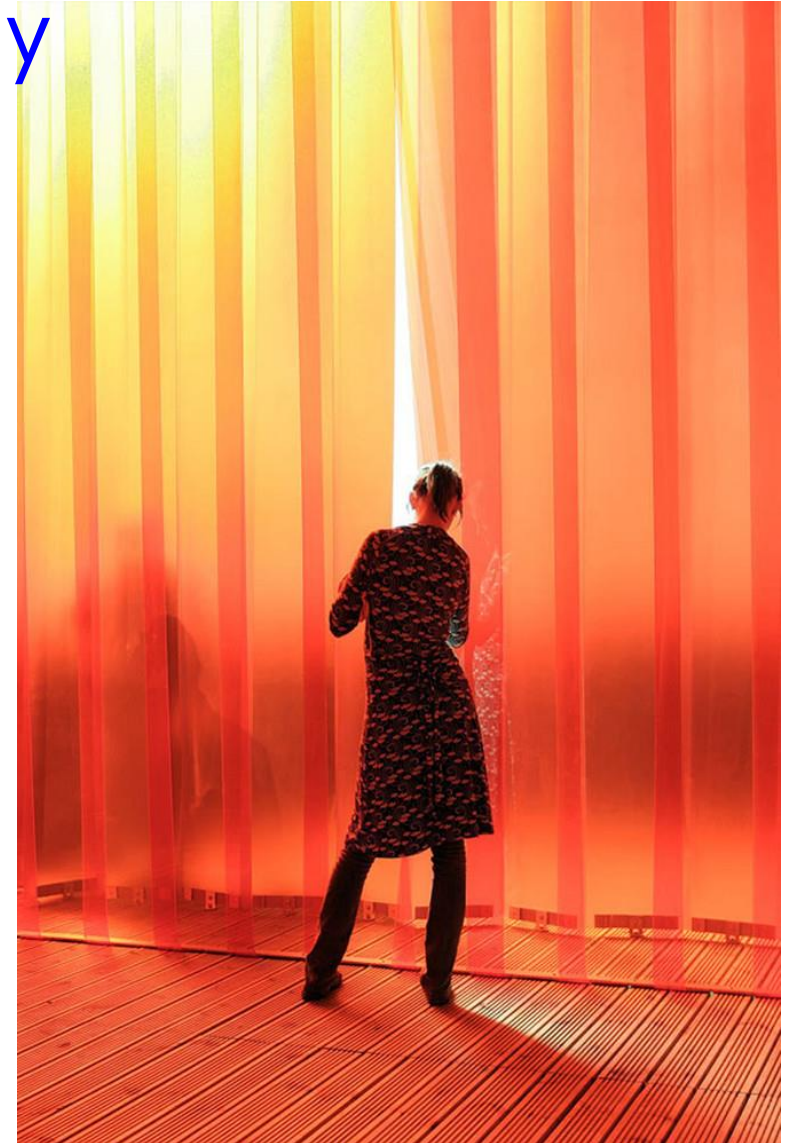
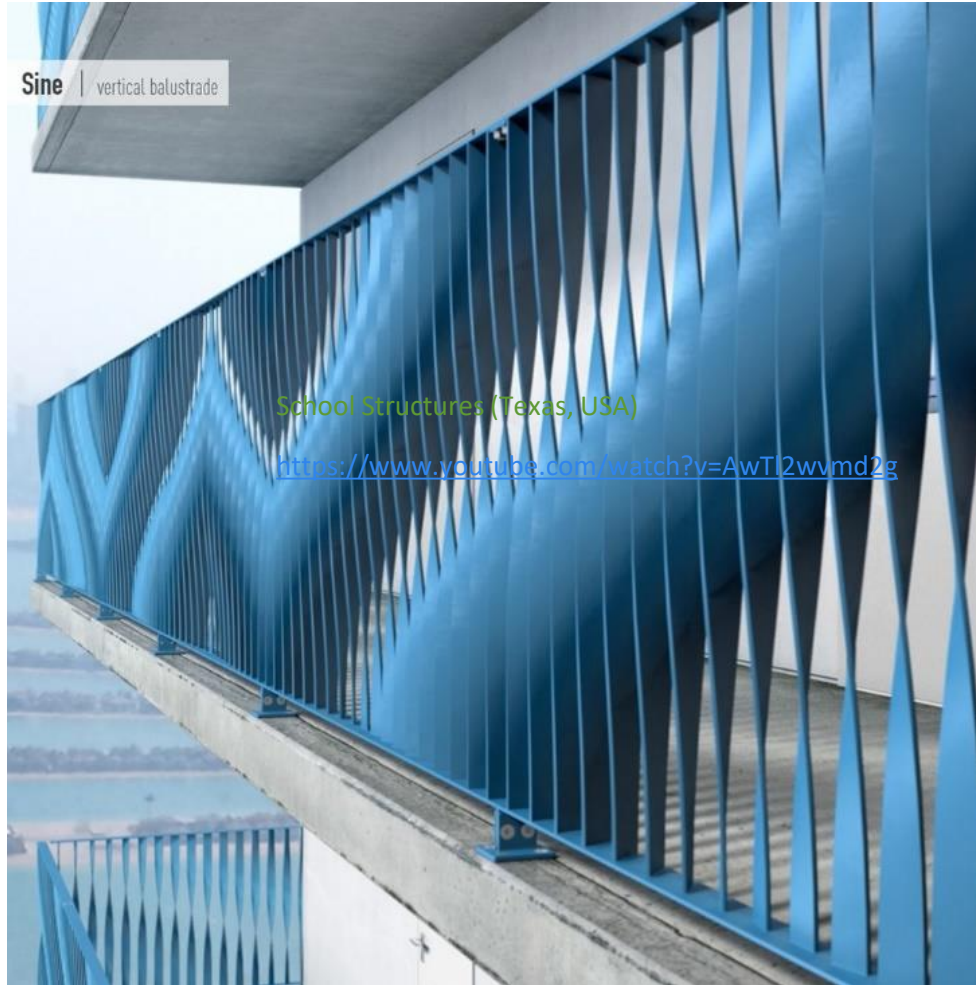
Colour of School  
changes every day







Colour of School  
changes every day





# Elements in Curriculum

- International Sign Language (IS) to be learned by all



InSign- Advancing inclusive education through International Sign

# STEAME School of the future

- **Architectural Designs in short animation**

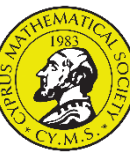


Video is published in STEAME Observatory

SEAMLEXITY

ADVANCED GEOMETRY INTEGRATION

Architectural Designs Subcontracted to  
[www.seamlexity.com](http://www.seamlexity.com)



# STRATEGIC ACTIONS

(The paradigm shift of school learning environments)

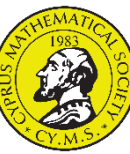
**How can we change current learning structures in schools into STEAME project based learning structures?**

**3 Steps for change  
from Education 2.0 to Education 4.0**





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# STRATEGIC ACTIONS

(The paradigm shift of school learning environments)

## 3 Steps for change from Education 2.0 to Education 4.0

- Step 1. Secure digital learning through learning videos created by teachers. Learning videos in 3 speeds. To become available through Learning Stations and Learning Rooms.

# STRATEGIC ACTIONS

(The paradigm shift of school learning environments)

## 3 Steps for change from Education 2.0 to Education 4.0

- Step 2. Train teachers how to cooperate between different disciplines and how to develop(co-create) STEAME Learning & Creativity plans. Train teachers how to cooperate with academic and industry and how to do STEAME related activities in hybrid environments.

**Give teachers freedom to create. Give students freedom to create.**

# STRATEGIC ACTIONS

(The paradigm shift of school learning environments)

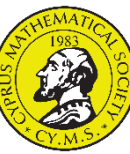
## 3 Steps for change from Education 2.0 to Education 4.0

- Step 3. Create open spaces in current schools or build the new schools with more open spaces for project based cooperative work between students. Create appropriate laboratories for creative work.





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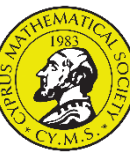
# STRATEGIC ACTIONS

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- Step 2. Train teachers how to cooperate between different disciplines and how to develop(co-create) STEAME Learning & Creativity plans. Train teachers how to cooperate with academic and industry and how to do STEAME related activities in hybrid environments. Give them freedom to create.
- Step 3. Create open spaces in current schools or build the new schools with more open spaces for project based cooperative work between students.



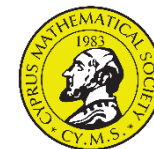
# Exploitation and Sustainability Activities

**Building more blocks**

**Creating the critical mass**



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# EUROMATH & EUROSCIENCE 2022

STEAME school students and their teachers

27 June – 1 July 2022

in Thessaloniki, Greece

Watch Video – 60 sec

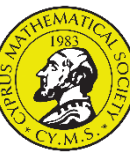


[www.euromath.org](http://www.euromath.org)



Project Number: 2019-1-CY01-KA201-058240





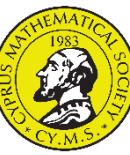
## More STEAME Opportunities and challenges

### ***The EUROPEAN STEAME Communication Competitions***

- For adults, with international participation
- Pre-video submission for phase 1 is required
- Communicate STEAME Subjects in 5 minutes and win your place at the finals of the European STEAME Communication Competition 2022



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# Mathematics Journalistic Article Competition 2021

- For students of ages 10-19



**THEME**

**“The Role of Mathematics in STEAME Education”**

## European Comic Poster Competition in STEAM 2022

- **For students of age 14-18**

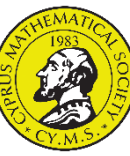


<https://steam-edu.eu/#competitions>

**EUROMATH & EUROSCIENCE 2022**  
VENUE: GRAND PALACE HOTEL  
11-16 MARCH 2022, THESSALONIKI, GREECE





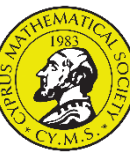


# STEAME SUMMER CAMP 2022

**25-30 July 2022, Agros, Cyprus**

**For grades 4-9 (Ages 10-15)**





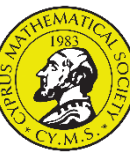
***NEW Project***

# **STEAME GOES HYBRID**

**Blueprint Guidelines and Policy Recommendations**

Started on 1 May 2021





# STEAME GOES HYBRID

## Blueprint Guidelines and Policy Recommendations

- O1: Blueprint Guidelines for Hybrid STEAME activities
- O2: Training Programme for facilitating the implementation of STEAME L&C Plans by SE teachers and Piloting the Blueprint Guidelines
- O3: STEAME HYBRID Blueprint at a glance : Policy Recommendations and School Label Development





# New Challenges Approved

started on 1 June 2021

## NEW PROJECTS

**ETRE:** Empowering schools' transition readiness to a distance/hybrid learning model enhanced by cloud technology tools (<http://etre-project.eu/> )

Started on 1 June 2021

**ONLIFE:** Empower Hybrid Competencies for ONLIFE Adaptable Teaching in School Education in times of pandemic, (<http://onlife.up.krakow.pl> )

Started on 1 June 2021

# New Challenge Approved

Will start on 1.1.2022

## BYOD-Learning

Learning at Any Time, at Any Place via any Device

**R1- European Platform of Video Lessons** hosting videos accessible by teachers, students at any time and any place and through any device applying an approach of BYOD (Bring Your Own Device).

**R2- Methodology and specifications for the design of the video lessons** and set of digital tools and guidance on the digitalisation of the educational content to facilitate the learning process

**R3- Training course for supporting teachers and educators to digital transformation** through development of digital readiness, resilience and capacity in mathematical education

# New Challenge Approved

will start on 1 January 2022

## **TTF** **Teach the Future**

R1. Report: Teaching the future – climate, citizenship and digital teaching – curriculum and pedagogical guidelines

R2. Digital data dashboard for accessing climate data / information

R3. Teach The Future Teacher training course



# New Challenge Approved

will start on 1 February 2022

$$E=MD^2$$

**Excellence in Math Education through  
(e-)Debate and Diversity**

# New Challenge Approved

Will start 1.2.2022

## **FACILITATE – AI: Guidelines for facilitating the learning of Artificial Intelligence (AI) by School Students of Grades 7-12**

- R1. AI Teaching Guide for teachers facilitating the learning of students in grades 7-12
- R2. Training Course for Facilitators of learning in AI-STEAME Education
- R3. Dynamic Online Learning Environment with OER on AI in interdisciplinary STEAME school subjected with a set of Blueprint Policy Recommendations

# Next Expected Challenge

STEAME ACADEMY

**STEAME TEACHER FACILITATORS ACADEMY**

KA2 PROGRAMME TEACHER ACADEMIES

Submitted 7 September 2021



# Next Expected Challenge

European STEAME School Students Community

KA2 Small Scale project

Submitted 3 November 2021

*And the Puzzle of the **Paradigm Shift** would probably be completed*

*The yeast is ready.....lets make the bread!*

Student are  
ready,  
.....we are  
not ready for  
them!



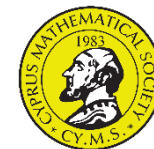
**We invest in the development of competence and skills**

**.....the competence to apply knowledge and the competence to self-adapt to change in technologies!**





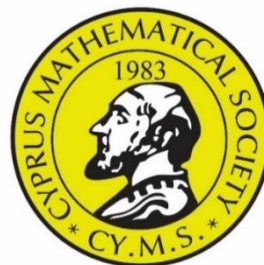
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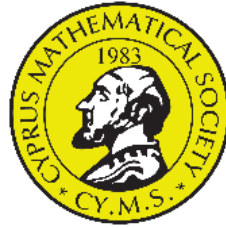
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**Prof. Ivan Apostolov**  
ENGLISH LANGUAGE SCHOOL



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